Chapter 8
Digital Classrooms Equipped with Tablet Computers as the Students’ Learning Companions

ABSTRACT
This chapter briefly reviews the history of tablet computers and other mobile devices and their application in education as electronic textbooks, schoolbags, and learning companions. The tablet computers can be used as students’ electronic learning companions because of their intelligence and interactivity. The conventional classroom will become a digital classroom if every student is equipped with a tablet computer and all the students’ and the teachers’ computers are connected by the wireless network. Supported by the intelligent instruction system CSIEC, all the students can instantly interact with the learning content, other students, and the teacher. The teacher can monitor the learning process of all students and give instant and individual feedback to every student. This chapter introduces the instructional design principles of such a digital classroom for English in junior high schools. The design’s pilot application demonstrated that this approach interested and motivated the pupils in the classroom.

TABLET COMPUTERS
In the history of education, the technological advancement often led to educational innovation so that the education becomes more efficient, fair, convenient and popular. Typography, blackboard and computer are all such technologies. Since the beginning of twenty-first century, the speedy advancement of information and communication technology is mainly incarnated that the integration of the chips become more and more intensive, the calculating speed of the CPU (Central Processing Unit) become more and more high, the storage capacity of internal and external memory become more and more big, the network capability become more and more strong, the input and output device become more and more convenient and healthy, the application software become more and more plentiful and intelligent, and the price become more and more cheap and acceptable.

Tablet Personal Computer (Tablet PC, Flat PC, Tablet or Pad) is such a kind of a mobile computer with touch screen display, ARM CPU, on-board flash memory, Wi-Fi standard Wireless internet

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connectivity, and a long-life battery in a single unit. Tablets are equipped with sensors, including a touchscreen, a front- and/or back camera(s) for photographs and video taking, a microphone for sound recording, optional accelerometer that detects the physical movement and orientation of the tablet and allows the touchscreen display to shift to either portrait or landscape mode, and optional ambient light and proximity sensors that helps distinguish between intentional and unintentional touches.

Tablets have ports to charge the battery for removable storage, as well as USB Ports to connect external mouse, keyboard, or wired LAN cable. Tablets may include physical buttons, e.g., to control basic features such as speaker volume and power on/off, Bluetooth for connecting peripherals and communicating with local devices, and GPS satellite location.

The basic input and display device is the single touchable high-definition and anti-glare display. Touchscreens are usually one of two forms: resistive and capacitive touchscreens. Resistive are passive and respond to pressure on the screen. They allow a high level of precision, and are useful in emulating a pointer, what is common in tablet computers but may require calibration. Because of the high resolution, a stylus or fingernail is often used. Capacitive touchscreens tend to be less accurate, but more responsive than resistive devices. A key component among tablet computers is touch input with finger or stylus gestures replacing computer mouse and keyboard. This allows the user to navigate easily by touching the icons. The system must respond to touches rather than clicks of a mouse, and allow integrated hand-eye operation, a natural use of the somatosensory system. This is even true of the more recent multi-touch interface, which often emulates the way objects behave. An on-screen, pop-up virtual keyboard is usually used for typing. With embedded or added high-quality handwriting recognition application, the user can write alphabets, digits, special characters and even oriental and stroke-based characters, such as Chinese, Korean and Japanese writing.

Tablets are typically larger than smart phones or personal digital assistants at 7 inches (18 cm) or larger at 10 inches (25 cm), measured diagonally. Its mass is less than 500 grams. A tablet computer is small enough to be put into the lady’s handbag or the pupil’s schoolbag, but powerful enough to work like an ordinary personal computer.

Conceptualized in the mid-20th century and prototyped and developed in the last two decades of that century, the devices became popular in 2010. Among tablets available now, the top sold devices are Apple’s iPad equipped with iOS and other manufactures’ tablets equipped with Android OS.

The mainstream operating systems run in tablet computers are Andriod, iOS and Windows. At the end of Q1 2013, GlobalWebIndex (https://www.globalwebindex.net/) noted that in 2 years tablet usage increased by 282 percent, with 156 million Android Tablet users and 122 million iPad users making up 75 percent.

The popularity of tablet computer in the recent years around the world was initiated by the well-selling of iPad from Apple Inc. since 2010. The iPad runs iOS, which was built for the ARM architecture and created for the iPhone and iPod Touch. Although built on the same underlying UNIX implementation as MacOS, its user interface is radically different. The iOS is designed for fingers and has none of the features that required a stylus on earlier tablets. Apple introduced multi-touch gestures, such as moving two fingers apart or together to zoom in or out, also known as “pinch to zoom”. The user interface of iOS is based on the concept of direct manipulation, using multitouch gestures. Interface control elements consist of sliders, switches, and buttons.

Android is a Linux-based operating system that Google offers as open source under the Apache license. It is designed primarily for mobile de-